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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,749	02/18/2004	Yoshihiro Kimura	H6808.0040/P040	2045

24998 7590 01/25/2012

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EXAMINER	
JOHNSTON, PHILLIP A	

ART UNIT	PAPER NUMBER
2881	

MAIL DATE	DELIVERY MODE
01/25/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/779,749	KIMURA ET AL.	
	Examiner	Art Unit	
	PHILLIP A. JOHNSTON	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 December 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *12-16,19 and 20* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *12-16,19 and 20* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *18 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

1. This Office Action is submitted in response to the amendment filed 12-5-2011, wherein claims 12, 14-16 and 20 have been amended. Claims 12-16,19 and 20 are pending.

Examiners Response to Arguments

2. Applicant's arguments filed 12-5-2011 have been fully considered but they are not persuasive.

3. The Applicant argues at page 8 of the remarks that, Applicants respectfully submit that a concave and convex determination for line and space patterns may be made based on a derivative waveform for a single peak, as described above. Therefore, Applicants respectfully submit that the rejection be withdrawn and the claims allowed.

The examiner disagrees for the same reasons stated in response to previous arguments (see previous office actions), where the examiner has repeatedly stated that the applicant's specification does not provide an adequate written description to support the claimed "judging" limitation, which describes first and second distances of the derivative of a single peak of a profile waveform, where the longer of the two distances corresponds to a line pattern and the shorter of the two distances corresponds to a space pattern.

The amendments to the claims filed 12-5-2011 have done nothing to change the examiners previous position.

For example, the amended "judging limitation" now states; judging the longer of the first and second distances on both sides of the single peak of the profile waveform

to correspond to a line pattern, or the shorter of the first and second distances on both sides of the single peak of the profile waveform to correspond to a space between the line patterns, based on a comparison between the first distance and the second distance; which the examiner has interpreted again to mean that first and second distances of a derivative of a single peak of a profile waveform are used to determine the presence of a line in a pattern or a space between lines in a pattern.

The examiner accepts the argument that a claim limitation describing the use of first and second distances of a derivative of a single peak of a profile waveform, can be used determine the concave or convex portions of that single peak because it is properly described in the applicant's specification; however, the applicant's specification does not contain any description that specifically describes how the concavity and convexity determination is applied to any other portion of the pattern, and is particularly lacking in a description regarding application of the claimed derivative to the boundaries that define where the lines and spaces of the pattern begin and end.

The specification would suggest to one of ordinary skill in the art, how the claimed derivative can be applied to make a convex/concave determination to one portion at the top of a line in a pattern of lines and spaces. And also would suggest how it can similarly be applied to the second portion at the top of the same line, as well as repeated for the top portions of each line of the entire pattern. However, the specification contains no description as to exactly how that same convex and concave determination would be applied to the bottom portion of each line and/or the space

between adjacent line patterns, nor does it suggest to one of ordinary skill, how it might be so applied.

Therefore, one of ordinary skill in the art cannot use the written description to make and use the invention.

Therefore in light of the above, it is the examiners contention that the

In response to applicant's argument that the references fail to show a certain feature of applicant's invention, it is noted that the feature upon which applicant relies (i.e., an electrically coupled drain/source is not electrically contacted to any contact accessible from the surface of the dielectric layer) is not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed Cir 1993).

4. The rejection of claims 12-16, 19 and 20 are maintained.

5. All claims stand finally rejected.

Claims Rejection – 35 U.S.C. 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 12 and 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contain subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Particular subject matter contained in claims 12 and 14 includes the limitation, "judging the longer of the first and second distances on both sides of the single peak of the profile waveform to correspond to a line pattern, or the shorter of the first and second distances on both sides of the single peak of the profile waveform to correspond to a space between the line patterns, based on a comparison between the first distance and the second distance;"

The examiner has construed the newly amended limitation above using paragraph's [0034] through [0040] in applicants published specification, and concluded that the newly amended claim limitation is improper because the specification does not describe; judging, by comparing the distances 405S and 405L of the derivative of peak 401 (note Figure 4), as corresponding to a line pattern or a space between line patterns, but rather the distances 405S and 405L correspond to the space side and the line side respectively of the peak vertex of the profile 401.

The examiner also concludes that the claimed first and second distances of the derivative waveform cannot be used to determine a line pattern or a space between line patterns, because the first and second distances of the derivative waveform are calculated for a single peak of a profile waveform corresponding to the top of a line feature of a pattern, and one of ordinary skill in the art recognizes that a profile waveform of a line pattern contains two peaks that define the top portion of each line of the pattern and a space between each set of two peaks, which defines the spaces in the line/space pattern, as applicant describes relative to Figure 3C. However, the specification contains no description of derivative waveforms being calculated for both peaks of a scanned profile waveform, as the prior art references teach. Nor would it suggest to one of ordinary skill in the art that the applicant's single peak derivative

method is merely a trivial extension to an entire line/space pattern, particularly since applying the derivative to the base of the line feature of the pattern has not been described in the disclosure, nor is there a description regarding the boundaries between the peak profile or how a derivative is applied to define the concavity or convexity of the space portions of the profile waveform.

Therefore, a claim of a method of determining a pattern or a space between adjacent line patterns that is described in the specification as based upon a single derivative of a single profile peak, does not constitute a specification that contains a written description of the invention, and the manner and process of making and using it, in full, clear, concise, and exact terms that would enable any person skilled in the art to make and use the invention

For purposes of this examination, the examiner assumes the newly amended claim 12 and 14 limitation above", will read as follows;

"12. (Currently amended) A method of determining a line pattern or patterns arranged as a plurality of line patterns on a sample, the method comprising the steps of:

scanning a portion including an edge of a line pattern on the sample with a charged particle beam;

forming a derivative waveform based on a profile waveform formed by detecting charged particles emitted from the scanned portion of the sample;

acquiring a first distance between a top and a foot portion of a first peak of a pair of peaks that the derivative waveform has, and a second distance between a top and a foot portion of a second peak of the derivative waveform;

judging the longer of the first and second distances to correspond to the top portion of a line, based on a comparison between the first distance and the second distance;

adjusting, based on a judgment result of line portion from the judging step, a position of an image in such a manner that a position of a portion of the image to be measured is brought to a position that has been set for measuring a pattern size;

and

skipping the measuring of the pattern size of the portion to be measured in the event that no judgment result is obtained."

Claim 14 is assumed to be modified similarly, by removing the reference to the "space between adjacent line patterns".

Claims Rejection – 35 U.S.C. 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 12-16, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,627,887 to Dudley, in view of Archie, USPN 6,472,662.

7. Regarding claims 12 and 14, Dudley discloses at Col. 2, line 48-66, a method of determining a line pattern that includes the following steps;

(a) scanning a particle beam over line structure 126 as shown in Figure 2 below, where a dimensional or profile waveform is generated by detecting the quantity of particles deflected back from the line structure, which is saved in memory. Col. 2, line 63-67 and Col. 3, line 1-7,

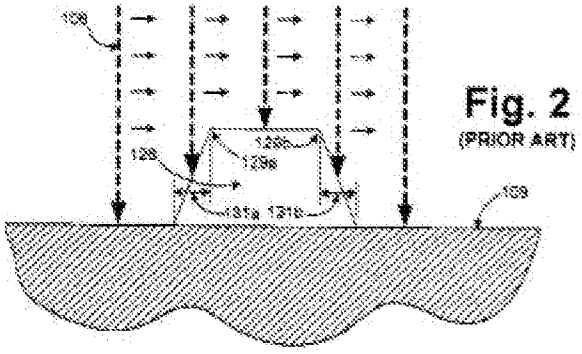


Fig. 2
(PRIOR ART)

(b) forming the derivative waveform from the stored dimensional waveform, which includes the top portion of the line feature, as shown in Figure 3A below. Col. 3, line 8-15; and Col. 5, line 5-20,

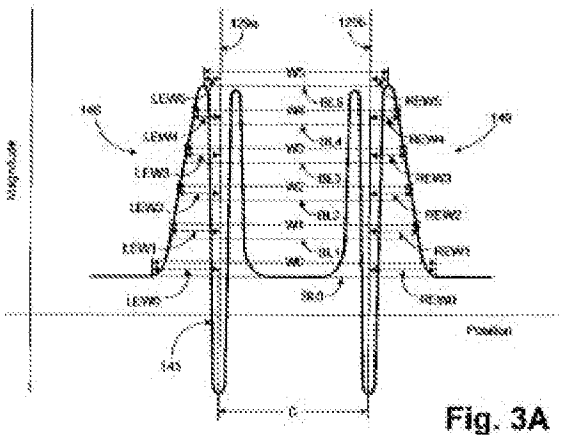
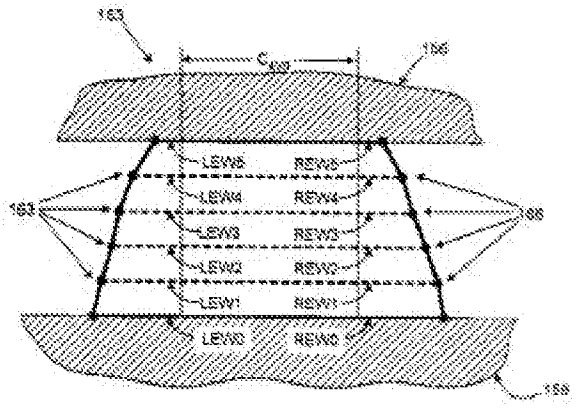


Fig. 3A

(c) comparing first longer distance LEW2 (Figure 3A above) of the positive derivative peak and second shorter distance LEW 5 of the negative derivative peak 143, which defines the boundary 129a (note Figure 2) between the space-side and the line side of the peak, as well as the entire transition 131a from the left foot to the top edge of the left profile peak. Col. 3, line 16-50,

(d) determining the shape of the whole structure 126 as shown in Figure 3B, from the pairs of longer and shorter distances LEW1-5 and REW 1-5 between the two peaks in the derivative waveform (note Figure 3A above). Col. 3, line 63-67 and Col. 4, line 1-30.



Dudley discloses scanning the entire patterned structure of an integrated circuit at Col. 1, line 57-67 and Col. 2, line 1-10.

Dudley fails to disclose determining a line pattern.

Archie discloses obtaining waveforms of SEM scans over line and space patterns at col. 1, line 44-55 and col. 3, line 4-8

Archie modifies Dudley to provide waveforms of scanned line and space patterns, where the geometry of the pattern includes equal line and space widths. Col. 8, line 55-67 and Col. 9, line 1-5.

Therefore it would have been obvious to one of ordinary skill at the time the invention was made that the scans of integrated circuit patterns of Dudley would include forming derivatives of each line in the line patterns of Archie, thereby determining the shape of an entire line pattern.

Regarding the newly amended limitation; skipping the measuring of the pattern size of the portion to be measured in the event that no judgment result is obtained; it would have been obvious to one of ordinary skill at the time the invention was made that one would skip measuring the pattern size if no judgment result was obtained, since the lack of a judgment result would make the subsequent pattern size measurement an extra, meaningless step.

8. Regarding claims 13 and 16, the combination of Dudley and Archie discloses the use of patterns having equal lines and spaces, as described above regarding claims 12 and 14.

9. Regarding claim 15, Dudley discloses referencing the pairs of longer and shorter distances LEW1-5 and REW 1-5 in the derivative waveform to baseline levels at the base or feet of each pair of peaks, where the 0% baseline level is equivalent to a zero line, base or flat line. Col. 3, line 16-25.

10. Regarding new claims 19 and 20, Dudley fails to teach determining a target location for measurement of a sample based on the judged positions of the line patterns; however Dudley discloses use of a target structure and comparing measured profiles with a target profile. Col. 5, line 46-53. Dudley further teaches that the edges of the target structure are defined by coordinates at Col. 7, line 62-65 and col. 10, line 22-30.

One of ordinary skill in the art would recognize from the references above that samples are measured relative to the coordinate system location of the standard target of Dudley.

Therefore it would have been obvious to one of ordinary skill at the time the invention was made that the combination of Dudley and Archie teaches the claimed measuring of the pattern in accordance with the method described above regarding claims 12 and 14.

Conclusion

6. The Amendment filed on 12-5-2011 has been considered but the arguments are moot in view of new grounds for rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571) 272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ
January 16, 2012

/PHILLIP A JOHNSTON/

Primary Examiner, Art Unit 2881